Remarks:

Status of Claims

Claims 2 to 6, 11 and 19 to 31 were previously pending. Claim 2 is cancelled herein without prejudice or disclaimer. Claims 3, 5, 11, 19, 24 to 25 and 27 have been amended and no claims have been added.

Applicant submits that no new matter has been added as a result of the amendments to the claims.

Office Action

In the Office Action dated 14 October 2008 rejects claims 2 to 6, 11, 19, 20 and 24 to 28 as being anticipated by Saunders (US Patent No. 5,574,467). Applicant respectfully submits that Saunders does not teach all the features recited in the currently amend claims.

Saunders teaches the use of a radio frequency (RF) signal, transmitted from a mobile source location, to determine an orientation quantity. The RF signal is received and a phase signal representative of the phase of the RF signal is detected. This phase signal is filtered to extract a component, which is processed to form a signal representative of the orientation of the quantity (see column 2 lines 1 to 19 of Saunders).

Differencing the 1st and 2nd Cyclic Doppler

With reference to Figure 6 of Saunders, a filtering process is used to extract a signal component at the frequency of rotation. As discussed in column 7 lines 35 to 39 (as quoted by the Examiner):

> "*The filter 126 filters the phase signal to* ***extract*** *a first signal component at the frequency at which the effective receiving location passes through successive ones of the extreme points*" **[emphasis added]**.

It will be known to those skilled in the art that the process of filtering is designed to extract a specific frequency. More accurately, a filtering process is

exclusionary and designed to extract a particular signal component from a signal (see for example column 2 lines 15 to 16 of Saunders). In contrast, a differencing process is one whereby one signal is subtracted from another signal.

In the Office Action, the Examiner appears to equate the process of filtering with the process of differencing. However, with respect, Applicant submits that these processes are markedly different from one another.

The differencing feature is recited in claim 24. As Saunders does not teach or suggest differencing, Applicant respectfully submits that claim 24 is novel and thus patentable over Saunders.

Adjusting the Predefined Motion

All the independent claims, as currently amended, recite the feature of adjusting the predetermined movement of the receiving means such that the receiving means is slewed into alignment with the radiating means. The Examiner notes that Saunders, at column 9, line 53-61, discloses:

"*By employing both a moving transmitting source and a moving receiving source along a non-planar path, four independent pieces of pose information (bearing, elevation and two attitude angles) may be obtained*".

That is, Saunders requires the movement of the receiving source to obtain two attitude angles. In contrast, Applicant discloses varying the speed or frequency of movement of an antenna element along a fixed path – in one example (see Figure 1 of the present application), the antenna element is rotatable mounted to a platform and the fixed path is circular.

The receiving means, once it receives the signal from the transmitting means, adjusts the speed of the antenna element until the Doppler value is at a minimum. This is because when the rotation of the transmitting antenna element is completely synchronised (that is, spatially correlated or aligned) with the rotation of the receiving antenna element, the Doppler value is zero. This is illustrated clearly in paragraph 0038 of the present specification:

"An antenna synchronisation control means118 is configured to ***adjust the speed*** *of the rotating means 114, until the received Doppler measured by the user receiver 107 is a minimum. The antenna synchronisation control means 118* ***increases or decreases the speed*** *of the rotating means 114, so that the receive antenna element slews into alignment with the transmit antenna element 103 rotation"* **[emphasis added]**.

Applicant respectfully submits that Saunders shows no provision for adjusting the speed/frequency of the predefined motion of either the transmitting or receiving means. Accordingly, as all of the claims as currently amended recite this feature, Applicant submits that all the claims are novel and thus patentable over Saunders.

Determining the Attitude

The present application teaches the determination of attitude of the receiving means based on the required adjustment to the predefined movement of the receiving means. Applicant respectfully submits that, since Saunders shows no provision for adjusting the predefined motion of either the transmitting or receiving means, it therefore cannot determine attitude based on the criteria of additional adjustment required.

Pre-defined Doppler Patterns

Claims 6 and 27 require the step of analysing the cyclic Doppler to determine a Doppler pattern, and then comparing the analysed Doppler pattern to pre-defined Doppler patterns to determine the attitude of the receiving means.

In contrast, as mentioned above, Saunders teaches filtering a signal to extract a phase component, and processing the phase component to determine various pieces of pose information. Saunders does not teach or suggest comparing the analysed Doppler pattern to pre-defined Doppler patterns.

Saunders specifically teaches the extraction of a frequency component from the received signal (see column 9 lines 1 to 10). However, the component, once extracted, does not undergo a comparison step. In fact, there is no information to which the extracted component can be compared to. The Saunders system simply

does not make any provision for storing or accessing pre-defined information of any sort and, therefore, Saunders does not provide any basis for a comparison step.

Accordingly, Applicant respectfully submits that claims 6 and 27 are novel and thus patentable over Saunders.

Predetermined Doppler Value

Applicant respectfully submits that Saunders shows no provision for minimizing the *Doppler* measured between the transmitting source and the receiving source by adjusting the predefined motion of the receiving source. As noted above, when the rotation of the transmitting antenna element is completely synchronised (that is, spatially correlated or aligned) with the rotation of the receiving antenna element, the Doppler value is zero. Therefore when the predetermined Doppler value is a minimum, the radiating antenna elements and the receiving antenna elements are most closely aligned.

Accordingly, Applicant submits that claim 4 is novel and thus patentable over Saunders.

Spatial Correlation of the Receiving Means and the Radiating Means

As used in the present application, spatial correlation between radiating antenna elements and receiving antenna elements means that the antenna elements are completely synchronised, or aligned. Another definition, which is given in the specification at paragraph 0037, is that:

"*When the transmit antenna element 103 and the receive antenna element 112 are rotating in unison, both antennas will traverse the most northerly point of their respective rotations concurrently. In this illustrative case, transmit antenna element 103 will traverse its most northerly point 106 at the same time as receive antenna element 112 is traversing its most northerly point 116. The antenna elements 103 and 112 are said to be* ***spatially correlated****, and the Doppler measured by the user receiver is a minimum*" **[emphasis added]**.

Applicant submits that Saunders does not teach, suggest nor even provide any motivation for aligning the transmitting source and the receiving source to be spatially correlated, as required in the Applicant's specification.

Furthermore, Applicant respectfully submits that Saunders shows no provision for adjusting the receiving means so that the phase centre movement of the receiving means is brought into spatial correlation with the phase centre movement of the transmitting means, as recited in claim 24. Accordingly, Applicant submits that claim 24 is novel and thus patentable over Saunders.

Conclusion

Applicant has developed a novel system and method for determining attitude using spatial shift key (SSK) modulation signatures. For the reasons given above, allowance of the remaining claims is respectfully requested.

Respectfully submitted,

27/3/09
Date

David SMALL
c/ Locata Corporation Pty Ltd
111 Canberra Avenue
Griffith ACT 2603
AUSTRALIA